

OPTIMIZATION OF LUBRICATION TECHNIQUES ON MACHINING PERFORMANCE OF ALUMINIUM ALLOY 319

ZAINAL ARIFFIN BIN SELAMAT

Doctor of Philosophy
(MANUFACTURING ENGINEERING)

UNIVERSITI MALAYSIA PAHANG



SUPERVISOR'S DECLARATION

We hereby declare that We have checked this thesis and in our opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Doctor of Philosophy (Manufacturing Engineering)

(SUPERVISOR'S SIGNATURE)

FULL NAME : DR. IR. AHMAD RAZLAN BIN YUSOFF

POSITION : ASSOCIATE PROFESSOR

DATE :

(CO-SUPERVISOR'S SIGNATURE)

FULL NAME : DR. MD MUSTAFIZUR RAHMAN

POSITION : PROFESSOR

DATE :



STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at University Malaysia Pahang or any other institutions.

(STUDENT'S SIGNATURE)

FULL NAME : ZAINAL ARIFFIN BIN SELAMAT

ID NUMBER : PMF12001

DATE : 22 NOVEMBER 2018

OPTIMIZATION OF LUBRICATION TECHNIQUES ON MACHINING
PERFORMANCE OF ALUMINIUM ALLOY 319

ZAINAL ARIFFIN BIN SELAMAT

Thesis submitted in fulfillment of the requirements
for the award of the degree of
Doctor of Philosophy
(Manufacturing Engineering)

Faculty of Manufacturing Engineering
UNIVERSITI MALAYSIA PAHANG

NOVEMBER 2018

ACKNOWLEDGEMENTS

I take this opportunity to express my heartfelt adulation and gratitude to my supervisor, Assoc. Prof. Dr. Ir. Ahmad Razlan bin Yusoff, Manufacturing Engineering Department, Prof Dr. Md. Mustafizur Rahman, Mechanical Engineering Department, University Malaysia Pahang, for his unreserved guidance, constructive suggestions, thought provoking discussions and unabashed inspiration in nurturing this research work. It has been a benediction for me to spend many opportune moments under the guidance of the perfectionist at the acme of professionalism. The present work is a testimony to his alacrity, inspiration and ardent personal interest, taken by him during the course of this thesis work in its present form. I convey my sincere thanks to him for providing necessary facilities in the Faculty of Manufacturing Technology, TATI University College to carry out my project..

It is a pleasure to acknowledge the support and help extended by all my colleagues at TATI University College. I cannot close these prefatory remarks without expressing my deep sense of gratitude and reverence to my dear parents for their blessings and Endeavour to keep my moral high throughout the period of my work. The author feels extremely happy to express his sincere appreciation to his wife Norzawize bt Embong and son Mohammad Luqman Haqimi, Mohammad Syazwan ,Mohammad Azim, Mohammad Danial, Mohammad Haikal, Aina Syahmimi and my special friend Abdul Rahman Mat Noor for their understanding, care, support and encouragement.

I want to express my sincere thanks to all those who directly or indirectly helped me at various stages of this work.

Above all, I express my indebtedness to the “**ALMIGHTY**” for all His blessing and kindness.

Last, but not the least, I thank the one above all of us, the omnipresent God, for giving me the strength during the course of this research work.

ABSTRAK

Secara tradisinya, pemilihan kaedah pemotongan untuk pemesinan hanya diserahkan kepada pengendali mesin. Di industri, proses pemesinan hanya bergantung kepada pengalaman dan kemahiran operator mesin untuk mencapai pemilihan parameter pemotongan yang optimum. Kelemahan amalan yang tidak saintifik ini menyebabkan penurunan didalam produktiviti kerana penggunaan keupayaan pemesinan yang tidak konsisten. Cabaran industri didalam pemesinan moden tertumpu pada prestasi pemesinan pada kekasaran permukaan, suhu dan kehausan alat pakai dengan mengurangkan penggunaan penyejuk. Objektif penyelidikan ini adalah untuk mengoptimumkan sistem muncung penyejukan dalam prestasi pemesinan aluminium aloi 319 (A319) untuk mencapai kekasaran permukaan yang baik, suhu yang lebih rendah dan meningkatkan jangka hayat mata alat dengan memilih parameter pemesinan yang sesuai bagi kelajuan pemotongan, kedalaman pemotongan dan kadar suapan. Sistem penyejuk yang digunakan adalah kering, basah dan muncung penyejukan yang optimum bersaiz 1.0 mm, 2.0 mm, 3.0 mm 4.0 mm dan 5.0 mm pada kekasaran permukaan, suhu dan jangka hayat mata alat menggunakan Respond Surface Method (RSM) pada mesin CNC Lathe dengan 2 pergerakan paksi. Kekasaran permukaan diukur menggunakan Surface Roughness Tester, suhu diukur menggunakan Thermometer Laser Inframerah dan jangka hayat mata alat diukur menggunakan Tool Maker Mikroskop. Minyak larut sintetik, mata alat bersalut Al_2O_3 cemented carbide dan aluminium aloi 319 digunakan sebagai alat pemotong dan bahan kerja. Kesan dari parameter pemotongan terhadap kekasaran permukaan, suhu dan jangka hayat mata alat dianalisis dengan menggunakan kaedah Analisis Varians (ANOVA) dan untuk mencapai prestasi pemesinan yang optimum dengan menggunakan Respond Surface Method (RSM). Pengoptimuman pelbagai parameter pemotong digunakan untuk memastikan kualiti produk dan mengurangkan kesan tenaga pemesinan. Hasil daripada eksperimen ini menunjukkan bahawa saiz muncung penyejuk bersaiz 1.0 mm memberi kekasaran permukaan yang baik, suhu yang lebih rendah dan memanjangkan jangka hayat alat mata berbanding muncung penyejuk bersaiz 2.0 mm, 3.0 mm, 4.0 mm dan 5.0 mm. Didalam eksperimen teknik pelinciran, faktor utama yang dianalisis oleh ANOVA adalah yang mempengaruhi kekasaran permukaan, suhu dan jangka hayat alat mata sebagai prestasi pemesinan adalah saiz muncung sebanyak 1.0 mm. Kelajuan pemotongan 270 m/min, kedalaman pemotongan 0.20 mm, kadar suapan 0.08 mm/min dan muncung teknik pelinciran bersaiz 1.0 mm adalah parameter optimum untuk meningkatkan dan mencapai kekasaran permukaan $0.94 \mu\text{m Ra}$, suhu 91°C dan jangka kehausan alat mata 0.48 mm dan 120 minit untuk masa jangka hayat mata pemesinan. Penentuan parameter yang optimum telah disahkan dengan pengesahan eksperimen dengan ralat 4 peratus maksimum dan memperolehi nilai keinginan optimum 0.935 untuk kelajuan pemotongan, kedalaman potongan, kadar suapan dan muncung penyejuk 1.0 mm. Kesimpulannya, prestasi keseluruhan yang optimum dari segi kekasaran permukaan, suhu dan jangka hayat alat mata dengan saiz muncung penyejuk bersaiz yang paling kecil dan parameter pemotongan yang berbeza boleh dibangunkan menggunakan teknik RSM. Penyelidikan semasa juga bermanfaat untuk meminimumkan dan meningkatkan produktiviti dalam industri pemesinan. Oleh itu, dapat mengurangkan kebergantungan pada pengalaman dan kemahiran operator pemesinan.

ABSTRACT

Traditionally, the selection of cutting parameters for machining was left to the machine operator. In industries, the machining parameters are dependent on the experience and skill of the machine operator to achieve an optimal product quality. The disadvantage of this unscientific practice is low in productivity due to the sub optimal use of machining capability. The challenges in the modern machining industries are mainly focused on the machining performance on the surface roughness, temperature and tool life with reducing the coolant utilization. The objective of this research is to optimize nozzle lubricant system in machining performance of aluminum alloy 319 (A319) to achieve a good surface roughness, lower temperature and increased tool wear by selecting suitable machining parameters of cutting speed, depth of cut and feed rate. The coolant system used are dry, wet and optimum coolant nozzle size of 1.0 mm, 2.0 mm, 3.0 mm 4.0 mm and 5.0 mm on the surface roughness, temperature and tool life using Respond Surface Method (RSM) on the CNC Lathe machine with 2 axes movements. The surface roughness is measured using Surface Roughness Tester, temperature is measured using Infrared Laser Thermometer and tool wear is measured using Tool Maker's Microscope. The synthetic soluble oils, coated cemented carbide Al_2O_3 insert and Aluminum alloy 319 were used as a cutting tool and workpiece material respectively. The effect of cutting parameters towards surface roughness, temperature and tool wear were analyzed using Analysis of Variance (ANOVA) method and to achieve optimum machining performance by using Respond Surface Method (RSM). Multi-optimization of cutting parameters is used in ensuring product quality and minimizing the energy effects of machining. The results of the nozzle size of 1.0 mm shows a good surface roughness, lower temperature and reduced tool wear compared to 2.0 mm, 3.0 mm, 4.0 mm and 5.0 mm nozzle size. In lubrication techniques experiment, the analysis using ANOVA show that the main factor affecting the surface roughness, temperature and tool wear as machining performance is the used nozzle size of 1.0 mm. Cutting speed of 270 m/min, depth of cut of 0.20 mm, feed rate of 0.08 mm/min and nozzle size lubrication techniques of 1.0 mm are the optimum parameters for improving and achieving the surface roughness of $0.94\text{ }\mu\text{m Ra}$, temperature of 91°C , tool wear length of 0.48 mm and the machining time taken is 120 minutes for tool life. The optimum parameters setting are verified with experimental validation with maximum 4 percent error and obtained optimal desirability value of 0.935 for the respective values of cutting speed, depth of cut, feed rate and coolant nozzle of 1.0 mm. In conclusion, the optimum overall performance in terms of surface roughness, temperature and tool wear with the smallest orifice size coolant and different cutting parameters can be developed using RSM technique. Current research is also beneficial to minimize and improve the productivity in machining industries. Consequently, reducing the dependent on the machining operators experience and skill.

TABLE OF CONTENT

DECLARATION

TITLE PAGE

ACKNOWLEDGEMENTS **ii**

ABSTRAK **iii**

ABSTRACT **iv**

TABLE OF CONTENT **v**

LIST OF TABLES **ix**

LIST OF FIGURES **x**

LIST OF SYMBOLS **xiii**

LIST OF ABBREVIATIONS **xiv**

CHAPTER 1 INTRODUCTION **1**

1.1 Background 1

1.2 Problem Statement 2

1.3 Objectives of the Study 4

1.4 Scope of the Study 4

1.5 Organization of the Thesis 5

CHAPTER 2 LITERATURE REVIEW **6**

2.1 Introduction 6

2.2 Turning Machine 7

2.2.1 Orthogonal Cutting Process 7

2.2.2	Turning Parameter	8
2.2.3	Turning Material	9
2.2.4	Material Al and Al Alloy	10
2.3	Turning Cutting Tool	12
2.4	Cutting Fluids	13
2.4.1	Application of Cutting Fluids	15
2.4.2	Selection of Cutting Fluids and Coolant Effects	16
2.5	Method of Cutting Fluids Application	17
2.5.1	Delivery Method of Nozzle Coolants	17
2.5.2	Flood Cutting Fluid application	17
2.5.3	Mist Cutting Fluid Application	17
2.5.4	Dry Machining Application	18
2.5.5	Pressure Cutting Fluid Application	19
2.5.6	Other Environment - Friendly Cooling Alternatives	20
2.6	Machining Performance	20
2.6.1	Surface roughness	20
2.6.2	Temperature	22
2.6.3	Tool Wear	24
2.6.4	Tool-Life	27
2.7	Optimization Technique	31
2.7.1	Conventional Optimization Techniques	31
2.7.2	Machining Optimization Technique	33
2.8	Method Design of Experiments	35
2.8.1	Central Composite Design (CCD)	36
2.9	Research Gaps	37

CHAPTER 3 METHODOLOGY	39
3.1 Introduction	39
3.2 Flow Chart of the Study	40
3.3 Machine Tool and Equipment	40
3.3.1 Drawing and Fabrication of Various Orifice Nozzles	45
3.4 Designing of various orifice nozzle	45
3.4.1 Material and Cutting Tool	47
3.4.2 CNC Lathe Machine Set -Up	49
3.5 Lubrication Cutting Condition	50
3.6 Experimenal parameter and design of experiment	52
3.6.1 Experimental Parameters for the Nozzle Size Effect	52
3.6.2 Experimental Parameter for the Coolant Effect	53
3.7 Machining Performance Measurement	56
3.7.1 Measurement of Surface Roughness	56
3.7.2 Measurement of Temperature	57
3.7.3 Measurement of Tool Wear and Tool Life	59
3.8 Experimental design Analysis for lubrication effects experiment	63
3.8.1 (ANOVA) Analysis of Variances	63
3.9 Multi-Objective Optimization	64
3.9.1 Mathematical Modelling by Response Surface Methods (RSM)	64
CHAPTER 4 RESULTS AND DISCUSSION	66
4.1 Introduction	66
4.2 Results for Nozzle Size Effect	66
4.2.1 Effect of Cutting Time on Surface Roughness for Difference Nozzle Size	66

4.2.2	Effect of Difference Nozzle Size on Surface Roughness	69
4.2.3	Effect of Nozzle Size on Temperature	70
4.2.4	Effect of Nozzle Size on Tool Wear	71
4.2.5	Effect of Nozzle Size on Tool Life	78
4.3	Results for Lubrication Effect on Dry, Wet and Nozzle Size	79
4.3.1	Lubrication Effect on Surface Roughness	80
4.3.2	Lubrication Effect on Temperature	87
4.3.3	Lubrication Effect on Tool Wear	91
4.3.4	Lubrication Effect on Tool Life	98
4.4	Results for Multi-Objective Optimization	102
4.4.1	Confirmation Test for Validation	106
4.4.2	Discussions	114
4.5	Summary	115
CHAPTER 5 CONCLUSION AND FUTURE WORKS		116
5.1	Conclusions	116
5.1.1	Contributions of the Study	118
5.1.2	Recommendations for Future Work	119
REFERENCES		120
APPENDIX 1		133
APPENDIX 2		134
APPENDIX 3		135
APPENDIX 4		136
APPENDIX 5		137

LIST OF TABLES

Table 3.1	Chemical composition of Al alloy 319 in weight %	47
Table 3.2	Physical data on Al alloy 319	47
Table 3.3	Characteristics of Al alloy 319	47
Table 3.4	Specifications of the cutting fluid	50
Table 3.5	Specification and type of machines used	50
Table 3.6	Specification and type of equipment used	51
Table 3.7	Cutting parameters and their levels for nozzle size effect conditions	52
Table 3.8	Cutting parameter and their levels for Lubrication conditions	53
Table 3.9	Values and levels selected for the variables of DOE	54
Table 3.10	Design of the experiments for lubrication effect	55
Table 3.11	Specification of portable surface roughness tester	56
Table 4.1	ANOVA and R-squared table for average surface roughness (R_a)	80
Table 4.2	Value of R-squared and adjusted R-squared	81
Table 4.3	ANOVA for temperature	87
Table 4.4	Value of R-squared and adjusted R-squared	88
Table 4.5	ANOVA and R-squared table for tool wear (TW)	91
Table 4.6	Value of R-squared and adjusted R-squared	92
Table 4.7	Coefficient of determination (R-Sq Value) for tool wear models	98
Table 4.8	Constraint optimization of cutting parameters and responses	103
Table 4.9	Solution of optimization of cutting parameters for the work material	103
Table 4.10	Optimum condition for response optimization of the lubrication effect	106
Table 4.11	Optimization results from RSM suggestion	114

LIST OF FIGURES

Figure 2.1	Model of orthogonal cutting process	7
Figure 2.2	Schematic of the experimental configuration for orthogonal cutting turning	8
Figure 2.3	Shapes of insert of cutting tool	13
Figure 2.4	Coordinates used for surface roughness measurement	21
Figure 2.5	Schematic of Talysurf	22
Figure 2.6	Typical temperature and head distribution in the cutting zone in turning process	24
Figure 2.7	Difference modes of tool wear	25
Figure 2.8	Flank wear	26
Figure 2.9	Crater wear	26
Figure 2.10	Adhesion wear	27
Figure 2.11	Flank wear progress as a function of time	30
Figure 2.12	Measurement of flank wear	31
Figure 2.13	CCD for (a) $k = 2$ and (b) $k = 3$ factors	36
Figure 3.1	Research workflow chart	41
Figure 3.2	(a) Schematic diagram experimental set-up with position of thermometer (b) Experiment Set-up PUMA 230 CNC lathe machine	43
Figure 3.3	Schematic diagram layout of the basic components of the coolant system	44
Figure 3.4	Example Designing Nozzle $\varnothing 1.0$ mm to Nozzle $\varnothing 5.0$ mm	45
Figure 3.5	Drawing and design of orifice with difference inner diameter	46
Figure 3.6	Machining process of an orifice nozzle	46
Figure 3.7	(a) Al_2O_3 -coated cemented carbide insert (VCGT 160404 TH K10) and (b) Tool insert and tool holder SVJCL-2525M16	48
Figure 3.8	Experiment set up and analysis of the setting	49
Figure 3.9	Basic condition of the coolant and layout for the cutting fluid cooling system	51
Figure 3.10	(a) Schematic diagram deviation of the arithmetic roughness parameter (b) R_a arithmetical measure of surface roughness and deviation of the arithmetic roughness parameter R_a	57
Figure 3.11	(a) Schematic Infrared laser measuring device (b) Infrared laser thermometer measuring device was fixed according to the optimum setup recommended by the device manufacturer.	58
Figure 3.12	Flank wear characteristics according to the ISO 3685:1993 standard used as a criterion for identifying the end of tool wear.	60

Figure 3.13	Optical metallurgy	61
Figure 3.14	Growth of flank wear and assessment of tool life	62
Figure 4.1	Effect of surface roughness to cutting time at different cutting speeds for 1.0 mm coolant nozzle size. ($F = 0.08$ mm/min, $D_{oc} = 0.2$ mm)	67
Figure 4.2	Effect of surface roughness to cutting time at different cutting speeds for 2.0 mm coolant nozzle size. ($F = 0.08$ mm/min, $D_{oc} = 0.2$ mm)	67
Figure 4.3	Effect of surface roughness to cutting time at different cutting speeds for 3.0 mm coolant nozzle size. ($F = 0.08$ mm/min, $D_{oc} = 0.2$ mm).	68
Figure 4.4	Effect of surface roughness to cutting time at different cutting speeds for 4.0 mm coolant nozzle size. ($F = 0.08$ mm/min, $D_{oc} = 0.2$ mm).	68
Figure 4.5	Effect of surface roughness to cutting time at different cutting speeds for 5.0 mm coolant nozzle size. $F = 0.08$ mm/min, $D_{oc} = 0.2$ mm	69
Figure 4.6	Effect of different nozzle size on surface roughness at cutting time of $V_c = 150$ m/mm $F = 0.08$ mm/min, $D_{oc} = 0.2$ mm	70
Figure 4.7	Effect of cutting temperature with different coolant nozzle size for	71
Figure 4.8	The tool was measured at the tool wear on tool flank wear by using SEM equipment	72
Figure 4.9	Effect of flank wear at different cutting times for different cutting speeds at coolant nozzle size of 1.0 mm	73
Figure 4.10	Effect of flank wear with different cutting times for different cutting speeds at a nozzle size of 2.0 mm	74
Figure 4.11	Effect of flank wear at different cutting times for different cutting speeds at a nozzle size of 3.0 mm	75
Figure 4.12	Effect of flank wear at different cutting times for different cutting speeds at a nozzle size of 4.0 mm	76
Figure 4.13	Effect of flank wear at different cutting times for different cutting speeds at a nozzle size of 5.0 mm	77
Figure 4.14	Effect of tool life at different cutting speed and machining length	78
Figure 4.15	(a) Normal probability plot of residuals and (b) residual vs. run	82
Figure 4.16	Main effect plots for surface roughness with (a) main plots of surface roughness (R_a) vs. feed rate, (b) main plots of surface roughness (R_a) vs. depth of cut, and (c) main plots of surface roughness (R_a) vs. the nozzle coolant system	84
Figure 4.17	Variation in surface roughness against input parameters with coated cemented carbide in the coolant system	86
Figure 4.18	SEM micrographs of wear length happen (a) 1.0 mm nozzle orifice, (b) wet coolant, and (c) dry machining of the material	87

Figure 4.19	(a) Main and 3D temperature plots of temperature, (b) normal plot of residuals of temperature, (c) model graphs of temperature and (d) externally studentized residuals of temperature	90
Figure 4.20	Main and 3D plots of temperature	93
Figure 4.21	Residual plots for normal probability	93
Figure 4.22	Residual plots for predicted vs. actual values	94
Figure 4.23	Individual influence of cutting parameters. (a) Main plots of tool wear vs. cutting speed, (b) main plots of tool wear vs. feed rate, (c) main plots of tool wear vs. depth of cut and (d) main plots of tool wear vs. coolant technique	96
Figure 4.24	Main and 3D surface plots of tool wear	97
Figure 4.25	Tool life at difference machining length for lubrication effect	98
Figure 4.26	SEM micrographs micrographs for the Effect of coolant technique application method on adhesive wear with different cutting speeds (using feed rate of 0.20 mm and depth of cut of 1.0	99
Figure 4.27	SEM micrographs for the Effect of coolant technique application method on adhesive wear with different cutting speeds (using feed rate of 0.20 mm and depth of cut of 0.6mm	100
Figure 4.28	SEM micrographs for the Effect of coolant technique application method on adhesive wear with different cutting speeds (using feed rate of 0.20 mm and depth of cut of 0.2mm	100
Figure 4.29	SEM micrographs and EDX patterns of temperature and tool wear increasing rapidly under dry machining due to intensive temperature and stresses at the tool tips. (a) Nozzle coolant of 1.0 mm diameter, (b) wet, (c) dry	102
Figure 4.30	Bar graph of desirability	104
Figure 4.31	Ramp function graph of desirability	105
Figure 4.32	Overlay plot of the three response criteria, cutting speed range, and feed rate location in the yellow (light) area that falls within the gray region (surface roughness, temperature, and tool wear)	107
Figure 4.33	Contour plot of desirability and multi-responses (cutting speed vs. feed rate)	107
Figure 4.34	Residual plots for (a) normal probability and (b) predicted vs. actual values	108
Figure 4.35	Temperature and tool wear increase rapidly under dry machining due to the intensive temperature and stresses at the tool tips: (a) nozzle = 1.0 mm coolant technique, (b) wet and (c) dry	110
Figure 4.36	Combination of factors that profoundly affects cutting speed vs. feed rate	112
Figure 4.37	3D surface plots for tool wear with the condition machine parameter	113

LIST OF SYMBOLS

Al	Aluminium
C	Carbon
Cr	Chromium
CCD	Central Composite Design
°C	Degree Celsius
C	Taylor's Constant
Cu	Copper
Dia or Ø	Diameter
D	Depth of cut
Fe	Iron
H.s.s.	High Speed Steel
L or Lg	Length
Mach	Machine
Math	Material
N	Nitrogen
N	Taylor's Exponential
R_a	Average Surface Roughness, μm
Si	Silicon
in/rev	Inches Per Minute
Ti	Titanium
V_c	Cutting Speed
WC	Tungsten Carbide
%	Percent
T	Tool Life
A	Angle
Θ	Polar Coordinate

LIST OF ABBREVIATIONS

Al ₂ O ₃	Aluminium Oxide
ANOVA	Analysis of Variance
C	Taylor's Constant
CNC	Computer Numerical Control
CCD	Central Composite Design
D	Diameter (mm)
D	Depth of cut (mm)
DOE	Design of Experiment
F	Cutting Feed
ISO	International Organization For Standardization
FW	Flank Wear
MM	Millimetre
MIN	Minute
MRR	Material Removal Rate
MQL	Minimum Quantity Lubrication
N	Taylor's Exponential
QTY	Quantity
PVD	Physical Vapor Deposition
RSM	Response Surface Methodology
RPM	Revolution of Experiment
SEM	Scanning Electron Microscope
Ti6Al4V	A type of Titanium Aluminium -Vanadium alloy
TiAlN	Titanium Aluminium Nitride
TiN	Titanium Nitride
T	Tool Life
TYP	Typical
3D	Three Dimensional
Wt%	Weight %

REFERENCES

- Agrawalla, Y. (2014). *Optimization of machining parameters in a turning operation of austenitic stainless steel to minimize surface roughness and tool wear*. BTech thesis.
- Ahmed, T. (2007). Analytical and experimental investigation of effects of high-pressure coolant on tool wear, tool life and surface roughness in turning steel.
- Ali, S., & Dhar, N. (2010). Tool wear and surface roughness prediction using an artificial neural network (ANN) in turning steel under minimum quantity lubrication (MQL). *World Academy of Science, Engineering and Technology*, 62, 830-839.
- Altintas, Y. (2012). *Manufacturing automation: metal cutting mechanics, machine tool vibrations, and CNC design*: Cambridge university press.
- An, Q., Fu, Y., & Xu, J. (2011). Experimental study on turning of TC9 titanium alloy with cold water mist jet cooling. *International Journal of Machine Tools and Manufacture*, 51(6), 549-555.
- Anderson, M. J., & Whitcomb, P. J. (2016). *RSM simplified: optimizing processes using response surface methods for design of experiments*: Productivity press.
- Ariffin, S. Z., Razlan, A., Ali, M. M., Efendee, A., & Rahman, M. (2018). *Optimization of Coolant Technique Conditions for Machining A319 Aluminium Alloy Using Response Surface Method (RSM)*. Paper presented at the IOP Conference Series: Materials Science and Engineering.
- Asiltürk, I., & Neşeli, S. (2012). Multi response optimisation of CNC turning parameters via Taguchi method-based response surface analysis. *Measurement*, 45(4), 785-794.
- Astakhov, V. P. (2012). Tribology of cutting tools *Tribology in Manufacturing Technology* (pp. 1-66): Springer.
- Attanasio, A., Gelfi, M., Giardini, C., & Remino, C. (2006). Minimal quantity lubrication in turning: Effect on tool wear. *Wear*, 260(3), 333-338.
- Ayed, Y., Germain, G., Ammar, A., & Furet, B. (2015). Tool wear analysis and improvement of cutting conditions using the high-pressure water-jet assistance when machining the Ti17 titanium alloy. *Precision Engineering*, 42, 294-301.
- Babu, M. N., Manimaran, G., & Muthukrishnan, N. (2017). Experimental estimation of minimum quantity lubrication in turning on AISI 410 stainless steel.

International Journal of Machining and Machinability of Materials, 19(6), 522-537.

- Bagaber, S. A., & Yusoff, A. R. (2017). Multi-objective optimization of cutting parameters to minimize power consumption in dry turning of stainless steel 316. *Journal of Cleaner Production*, 157, 30-46.
- Benedyk, J. (2010). Aluminum alloys for lightweight automotive structures *Materials, Design and Manufacturing for Lightweight Vehicles* (pp. 79-113): Elsevier.
- Bermingham, M., Kirsch, J., Sun, S., Palanisamy, S., & Dargusch, M. (2011). New observations on tool life, cutting forces and chip morphology in cryogenic machining Ti-6Al-4V. *International Journal of Machine Tools and Manufacture*, 51(6), 500-511.
- Bermingham, M., Palanisamy, S., Kent, D., & Dargusch, M. (2012). A comparison of cryogenic and high pressure emulsion cooling technologies on tool life and chip morphology in Ti-6Al-4V cutting. *Journal of Materials Processing Technology*, 212(4), 752-765.
- Bhattarai, S. (2015). Performance Analysis of Coated Single Point Cutting Tool in Turning Operation. *IJITR*, 3(4), 2234-2243.
- Black, J. T., & Kohser, R. A. (2017). *DeGarmo's materials and processes in manufacturing*: John Wiley & Sons.
- Bouزيد, L., Yallese, M. A., Chaoui, K., Mabrouki, T., & Boulanouar, L. (2015). Mathematical modeling for turning on AISI 420 stainless steel using surface response methodology. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 229(1), 45-61.
- Brinksmeier, E., Heinzl, C., & Wittmann, M. (1999). Friction, cooling and lubrication in grinding. *CIRP Annals*, 48(2), 581-598.
- Brinksmeier, E., Meyer, D., Huesmann-Cordes, A., & Herrmann, C. (2015). Metalworking fluids—Mechanisms and performance. *CRP Annals*, 64(2), 605-628.
- Bruni, C., Forcellese, A., Gabrielli, F., & Simoncini, M. (2006). Effect of the lubrication-cooling technique, insert technology and machine bed material on the workpart surface finish and tool wear in finish turning of AISI 420B. *International Journal of Machine Tools and Manufacture*, 46(12-13), 1547-1554.
- Burd, S. W., & Simon, T. W. (2000). *Effects of Slot Bleed Injection Over a Contoured Endwall on Nozzle Guide Vane Cooling Performance: Part I—Flow Field*

Measurements. Paper presented at the ASME Turbo Expo 2000: Power for Land, Sea, and Air.

Byers, J. P. (2017). *Metalworking fluids*: Crc Press.

Çakır, O., Yardımcı, A., Özben, T., & Kilickap, E. (2007). Selection of cutting fluids in machining processes. *Journal of Achievements in materials and Manufacturing engineering*, 25(2), 99-102.

Campatelli, G., & Scippa, A. (2016). Environmental impact reduction for a turning process: comparative analysis of lubrication and cutting inserts substitution strategies. *Procedia CIRP*, 55, 200-205.

Camposeco-Negrete, C. (2015). Optimization of cutting parameters using Response Surface Method for minimizing energy consumption and maximizing cutting quality in turning of AISI 6061 T6 aluminum. *Journal of Cleaner Production*, 91, 109-117.

Chinchanikar, S., & Choudhury, S. (2013). Effect of work material hardness and cutting parameters on performance of coated carbide tool when turning hardened steel: An optimization approach. *Measurement*, 46(4), 1572-1584.

Chou, Y. K., Evans, C. J., & Barash, M. M. (2002). Experimental investigation on CBN turning of hardened AISI 52100 steel. *Journal of Materials Processing Technology*, 124(3), 274-283.

Debnath, S., Reddy, M. M., & Yi, Q. S. (2014). Environmental friendly cutting fluids and cooling techniques in machining: a review. *Journal of Cleaner Production*, 83, 33-47.

Dhar, N., Islam, M., Islam, S., & Mithu, M. (2006). The influence of minimum quantity of lubrication (MQL) on cutting temperature, chip and dimensional accuracy in turning AISI-1040 steel. *Journal of Materials Processing Technology*, 171(1), 93-99.

Dhar, N., Paul, S., & Chattopadhyay, A. (2002). Role of cryogenic cooling on cutting temperature in turning steel. *Journal of Manufacturing Science and Engineering*, 124(1), 146-154.

Dosbaeva, G., El Hakim, M., Shalaby, M., Krzanowski, J., & Veldhuis, S. (2015). Cutting temperature effect on PCBN and CVD coated carbide tools in hard turning of D2 tool steel. *International Journal of Refractory Metals and Hard Materials*, 50, 1-8.

Ducros, C., Benevent, V., & Sanchette, F. (2003). Deposition, characterization and machining performance of multilayer PVD coatings on cemented carbide cutting tools. *Surface and Coatings Technology*, 163, 681-688.

- Dutta, S., Kanwat, A., Pal, S., & Sen, R. (2013). Correlation study of tool flank wear with machined surface texture in end milling. *Measurement*, 46(10), 4249-4260.
- El Hakim, M., Shalaby, M., Veldhuis, S., & Dosbaeva, G. (2015). Effect of secondary hardening on cutting forces, cutting temperature, and tool wear in hard turning of high alloy tool steels. *Measurement*, 65, 233-238.
- Ezugwu, E. (2005). Key improvements in the machining of difficult-to-cut aerospace superalloys. *International Journal of Machine Tools and Manufacture*, 45(12-13), 1353-1367.
- Feldshtein, E., Józwik, J., & Legutko, S. (2016). The influence of the conditions of emulsion mist formation on the surface roughness of AISI 1045 steel after finish turning. *Advances in Science and Technology Research Journal*, 10(30), 144--149.
- Ferreira, S. C., Bruns, R., Ferreira, H., Matos, G., David, J., Brandao, G., . . . Souza, A. (2007). Box-Behnken design: an alternative for the optimization of analytical methods. *Analytica Chimica Acta*, 597(2), 179-186.
- Fines, J. M., & Agah, A. (2008). Machine tool positioning error compensation using artificial neural networks. *Engineering Applications of Artificial Intelligence*, 21(7), 1013-1026.
- Fratila, D. (2016). Numerical and Experimental Approach of Cutting Temperatures to Green Turning of 42CrMo4 Steel. *Materials and Manufacturing Processes*, 31(5), 657-666.
- Ghan, H., & Ambekar, S. (2014). Optimization of cutting parameter for Surface Roughness, Material Removal rate and machining time of Aluminium LM-26 alloy. *International Journal of Engineering Science and Innovative Technology*, 3(2), 294-298.
- Girinath, B., Mathew, A., Babu, J., Thanikachalam, J., & Bose, S. (2018). Improvement of Surface Finish and Reduction of Tool Wear during Hard Turning of AISI D3 using Magnetorheological Damper.
- Goyal, A., Dhiman, S., Tyagi, S., & Sharma, R. (2014). Studying methods of estimating heat generation at three different zones in metal cutting: A review of Analytical models. *International Journal of Engineering Trends and Technology*, 8(10), 532-545.
- Hamdan, A., Sarhan, A. A., & Hamdi, M. (2012). An optimization method of the machining parameters in high-speed machining of stainless steel using coated carbide tool for best surface finish. *The International Journal of Advanced Manufacturing Technology*, 58(1-4), 81-91.

- Hanafi, I., Khamlichi, A., Cabrera, F. M., Almansa, E., & Jabbouri, A. (2012). Optimization of cutting conditions for sustainable machining of PEEK-CF30 using TiN tools. *Journal of Cleaner Production*, 33, 1-9.
- Hashmi, K. H., Zakria, G., Raza, M. B., & Khalil, S. (2016). Optimization of process parameters for high speed machining of Ti-6Al-4V using response surface methodology. *The International Journal of Advanced Manufacturing Technology*, 85(5-8), 1847-1856.
- Hasib, M. A., Al-Faruk, A., & Ahmed, N. (2010). Mist application of cutting fluid. *Journal of Machine Tools and Manufacture*, 10(4), 10-14.
- Hatt, O., Crawforth, P., & Jackson, M. (2017). On the mechanism of tool crater wear during titanium alloy machining. *Wear*, 374, 15-20.
- Jackson, M., & Morrell, J. (2011). Tribology in manufacturing *Tribology for Engineers* (pp. 161-241): Elsevier.
- Jafarian, F., Umbrello, D., Golpayegani, S., & Darake, Z. (2016). Experimental investigation to optimize tool life and surface roughness in inconel 718 machining. *Materials and Manufacturing Processes*, 31(13), 1683-1691.
- Joardar, H., Das, N., Sutradhar, G., & Singh, S. (2014). Application of response surface methodology for determining cutting force model in turning of LM6/SiCP metal matrix composite. *Measurement*, 47, 452-464.
- Kalpakjian, S., & Schmid, S. (2014a). Manufacturing Processes for Engineering Materials–5th Edition. *agenda*, 12, 1.
- Kalpakjian, S., & Schmid, S. R. (2014b). *Manufacturing engineering and technology*: Pearson Upper Saddle River, NJ, USA.
- Kamruzzaman, M., & Dhar, N. (2008). The effect of applying high-pressure coolant (HPC) jet in machining of 42CrMo4 steel by uncoated carbide inserts. *Journal*
- Kedare, S., Borse, D., & Shahane, P. (2014). Effect of minimum quantity lubrication (MQL) on surface roughness of mild steel of 15HRC on universal milling machine. *Procedia Materials Science*, 6, 150-153.
- Khan, A., Ali, M. Y., & Haque, M. (2010). A New Approach of Applying Cryogenic Coolant in Turning AISI 304 Stainless Steel. *International Journal of Mechanical and Materials Engineering*, 5(2), 171-174.
- Khan, M., Mithu, M., Halim, Z., & Sayem, A. (2012). Statistical design approach to process parameter optimisation for turning AISI 9310 alloy steel under

- minimum quantity lubrication environment. *International Journal of Machining and Machinability of Materials*, 11(2), 154-182.
- Khuri, A. I., & Mukhopadhyay, S. (2010). Response surface methodology. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2(2), 128-149.
- Kilickap, E., Huseyinoglu, M., & Yardimeden, A. (2011). Optimization of drilling parameters on surface roughness in drilling of AISI 1045 using response surface methodology and genetic algorithm. *The International Journal of Advanced Manufacturing Technology*, 52(1), 79-88.
- Kim, I.-J. (2017). Surface Measurement and Analysis *Pedestrian Fall Safety Assessments* (pp. 149-198): Springer.
- Kirby, E. D., Zhang, Z., Chen, J. C., & Chen, J. (2006). Optimizing surface finish in a turning operation using the Taguchi parameter design method. *The International Journal of Advanced Manufacturing Technology*, 30(11-12), 1021-1029.
- Kıvık, T. (2014). Optimization of surface roughness and flank wear using the Taguchi method in milling of Hadfield steel with PVD and CVD coated inserts. *Measurement*, 50, 19-28.
- Klocke, F., Krieg, T., Gerschwiler, K., Fritsch, R., Zinkann, V., Pöhls, M., & Eisenblätter, G. (1998). Improved cutting processes with adapted coating systems. *Cirp Annals*, 47(1), 65-68.
- Knotek, O., Löffler, F., & Krämer, G. (1992). Multicomponent and multilayer physically vapour deposited coatings for cutting tools *Metallurgical Coatings and Thin Films 1992* (pp. 241-248): Elsevier.
- Komanduri, R., & Hou, Z. (2001). A review of the experimental techniques for the measurement of heat and temperatures generated in some manufacturing processes and tribology. *Tribology International*, 34(10), 653-682.
- Krishankant, J. T., Bector, M., & Kumar, R. (2012). Application of Taguchi method for optimizing turning process by the effects of machining parameters. *International Journal of Engineering and Advanced Technology*, 2(1), 263-274.
- Kumar, B. M., Kumar, J. R., & Basu, B. (2007). Crater wear mechanisms of TiCN–Ni–WC cermets during dry machining. *International Journal of Refractory Metals and Hard Materials*, 25(5-6), 392-399.
- Kuo, H.-Y., Meyer, K., Lindle, R., & Ni, J. (2012). Estimation of milling tool temperature considering coolant and wear. *Journal of Manufacturing Science and Engineering*, 134(3), 031002.

- Kurgin, S., Barber, G., & Zou, Q. (2011). *Cutting insert and work piece materials for minimum quantity lubrication*. Paper presented at the Fourth International Seminar on Modern Cutting and Measurement Engineering.
- Kurgin, S., M. Dasch, J., L. Simon, D., C. Barber, G., & Zou, Q. (2014). A comparison of two minimum quantity lubrication delivery systems. *Industrial Lubrication and Tribology*, 66(1), 151-159.
- Kuttolamadom, M., Hamzehlouia, S., & Mears, L. (2010). Effect of machining feed on surface roughness in cutting 6061 aluminum. *SAE International journal of materials and manufacturing*, 3(2010-01-0218), 108-119.
- Lawal, S. A., Choudhury, I. A., & Nukman, Y. (2013). A critical assessment of lubrication techniques in machining processes: a case for minimum quantity lubrication using vegetable oil-based lubricant. *Journal of Cleaner Production*, 41, 210-221.
- Lenth, R. V. (2009). Response-Surface Methods in R, using rsm. *Journal of Statistical Software*, 32(7), 1-17.
- Leo Kumar, S., Jerald, J., Kumanan, S., & Prabakaran, R. (2014). A review on current research aspects in tool-based micromachining processes. *Materials and Manufacturing Processes*, 29(11-12), 1291-1337.
- Lindle, R., & Ni, J. (2012). Estimation of Milling Tool Temperature Considering Coolant and Wear. *Ann Arbor*, 1001, 48105.
- Luo, X., Cheng, K., Holt, R., & Liu, X. (2005). Modeling flank wear of carbide tool insert in metal cutting. *Wear*, 259(7-12), 1235-1240.
- Makadia, A. J., & Nanavati, J. (2013). Optimisation of machining parameters for turning operations based on response surface methodology. *Measurement*, 46(4), 1521-1529.
- Mamidi, V. K., & Xavior, M. A. A Review On Selection Of Cutting Fluids. *National Monthly Refereed Journal Of Research In Science & Technology*, 1-17.
- Markopoulos, A. P., Habrat, W., Galanis, N. I., & Karkalos, N. E. (2016). Modelling and optimization of machining with the use of statistical methods and soft computing *Design of Experiments in Production Engineering* (pp. 39-88): Springer.
- Maruda, R. W., Krolczyk, G. M., Nieslony, P., Wojciechowski, S., Michalski, M., & Legutko, S. (2016). The influence of the cooling conditions on the cutting tool wear and the chip formation mechanism. *Journal of Manufacturing Processes*, 24, 107-115.

- Mia, M., & Dhar, N. R. (2016). Prediction of surface roughness in hard turning under high pressure coolant using Artificial Neural Network. *Measurement*, 92, 464-474.
- Mia, M., Khan, M. A., & Dhar, N. R. (2017). High-pressure coolant on flank and rake surfaces of tool in turning of Ti-6Al-4V: investigations on surface roughness and tool wear. *The International Journal of Advanced Manufacturing Technology*, 90(5-8), 1825-1834.
- Mohanty, A., Gangopadhyay, S., & Thakur, A. (2016). On applicability of multilayer coated tool in dry machining of aerospace grade stainless steel. *Materials and Manufacturing Processes*, 31(7), 869-879.
- Mondolfo, L. F. (2013). *Aluminum alloys: structure and properties*: Elsevier.
- Montgomery, D. C. (2017). *Design and analysis of experiments*: John Wiley & sons.
- Motorcu, A. R., Kuş, A., & Durgun, I. (2014). The evaluation of the effects of control factors on surface roughness in the drilling of Waspaloy superalloy. *Measurement*, 58, 394-408.
- Muthukrishnan, N., & Davim, J. P. (2009). Optimization of machining parameters of Al/SiC-MMC with ANOVA and ANN analysis. *Journal of Materials Processing Technology*, 209(1), 225-232.
- Najiha, M., Rahman, M., & Yusoff, A. (2016). Environmental impacts and hazards associated with metal working fluids and recent advances in the sustainable systems: a review. *Renewable and Sustainable Energy Reviews*, 60, 1008-1031.
- Nalbant, M., Gökkaya, H., & Sur, G. (2007). Application of Taguchi method in the optimization of cutting parameters for surface roughness in turning. *Materials & Design*, 28(4), 1379-1385.
- Natasha, A., Ghani, J., Che Haron, C., Syarif, J., & Musfirah, A. (2016). Temperature at the tool-chip interface in cryogenic and dry turning of aisi 4340 using carbide tool. *International Journal of Simulation Modelling*, 15(2), 201-212.
- Naves, V., Da Silva, M., & Da Silva, F. (2013). Evaluation of the effect of application of cutting fluid at high pressure on tool wear during turning operation of AISI 316 austenitic stainless steel. *Wear*, 302(1-2), 1201-1208.
- Neşeli, S., Yıldız, S., & Türkeş, E. (2011). Optimization of tool geometry parameters for turning operations based on the response surface methodology *Measurement*, 44(3), 580-587.

- Noordin, M. Y., Venkatesh, V. C., Sharif, S., Elting, S., & Abdullah, A. (2004). Application of response surface methodology in describing the performance of coated carbide tools when turning AISI 1045 steel. *Journal of materials processing technology*, 145(1), 46-58.
- Nur, R., Kurniawan, D., Noordin, M., & Izman, S. (2015a). Optimizing power consumption for sustainable dry turning of treated aluminum alloy. *Procedia Manufacturing*, 2, 558-562.
- Nur, R., Noordin, M., Izman, S., & Kurniawan, D. (2015b). Machining parameters effect in dry turning of AISI 316L stainless steel using coated carbide tools. *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*, 0954408915624861.
- O'sullivan, D., & Cotterell, M. (2001). Temperature measurement in single point turning. *Journal of Materials Processing Technology*, 118(1-3), 301-308.
- Öktem, H., Erzurumlu, T., & Kurtaran, H. (2005). Application of response surface methodology in the optimization of cutting conditions for surface roughness. *Journal of Materials Pocessing Technology*, 170(1-2), 11-16.
- Olovsjö, S., & Nyborg, L. (2012). Influence of microstructure on wear behaviour of uncoated WC tools in turning of Alloy 718 and Waspaloy. *Wear*, 282, 12-21.
- Palanikumar, K. (2007). Modeling and analysis for surface roughness in machining glass fibre reinforced plastics using response surface methodology. *Materials & design*, 28(10), 2611-2618.
- Panda, A., Duplák, J., & Vasilko, K. (2012). Analysis of cutting tools durability compared with standard ISO 3685. *International Journal of Computer Theory and Engineering*, 4(4), 621.
- Parida, A., Routara, B., & Bhuyan, R. (2015). Surface roughness model and parametric optimization in machining of GFRP composite: Taguchi and Response surface methodology approach. *Materials Today: Proceedings*, 2(4-5), 3065-3074.
- Pervaiz, S., Deiab, I., Rashid, A., & Nicolescu, M. (2017). Minimal quantity cooling lubrication in turning of Ti6Al4V: influence on surface roughness, cutting force and tool wear. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 231(9), 1542-1558.
- Podder, B., & Paul, S. (2012). Improvement of machinability in end milling of Nimonic C-263 by application of high pressure coolant. *International Journal of Machining and Machinability of Materials*, 11(4), 418-433.
- Pramanik, A., & Littlefair, G. (2015). Machining of titanium alloy (Ti-6Al-4V)—theory to application. *Machining Science and Technology*, 19(1), 1-49.

- Puls, H., Klocke, F., & Lung, D. (2014). Experimental investigation on friction under metal cutting conditions. *Wear*, 310(1-2), 63-71.
- Rahman, M., Kumar, A. S., & Salam, M. (2002). Experimental evaluation on the effect of minimal quantities of lubricant in milling. *International Journal of Machine Tools and Manufacture*, 42(5), 539-547.
- Rao, R. V. (2011). Environmental Aspects of Manufacturing Processes *Advanced Modeling and Optimization of Manufacturing Processes* (pp. 339-360): Springer.
- Risbood, K., Dixit, U., & Sahasrabudhe, A. (2003). Prediction of surface roughness and dimensional deviation by measuring cutting forces and vibrations in turning process. *Journal of Materials Processing Technology*, 132(1-3), 203-214.
- Sahin, Y., & Motorcu, A. R. (2005). Surface roughness model for machining mild steel with coated carbide tool. *Materials & Design*, 26(4), 321-326.
- Sahoo, A., & Sahoo, B. (2011). Surface roughness model and parametric optimization in finish turning using coated carbide insert: Response surface methodology and Taguchi approach. *International Journal of Industrial Engineering Computations*, 2(4), 819-830.
- Santos, M., Machado, A., Barrozo, M., Jackson, M., & Ezugwu, E. (2015). Multi-objective optimization of cutting conditions when turning aluminum alloys (1350-O and 7075-T6 grades) using genetic algorithm. *The International Journal of Advanced Manufacturing Technology*, 76(5-8), 1123-1138.
- Sarıkaya, M., & Güllü, A. (2014). Taguchi design and response surface methodology based analysis of machining parameters in CNC turning under MQL. *Journal of Cleaner Production*, 65, 604-616.
- Sartori, S., Taccin, M., Pavese, G., Ghiotti, A., & Bruschi, S. (2017). Wear mechanisms of uncoated and coated carbide tools when machining Ti6Al4V using LN2 and cooled N2. *The International Journal of Advanced Manufacturing Technology*, 1-10.
- Seah, K., Li, X., & Lee, K. (1995). The effect of applying coolant on tool wear in metal machining. *Journal of Materials Processing Technology*, 48(1-4), 495-501.
- Shah, S., & Gerge, P. (2012). Surface roughness modeling in precision turning of aluminium by polycrystalline diamond tool using response surface methodology. *W: International Journal of Emerging Technology and Advanced Engineering*, 2(5).
- Sharma, S. K., & Kumar, E. S. (2014). Optimization of Surface Roughness in CNC Turning of Mild Steel (1018) using Taguchi method. *Carbon*, 100, 0.26.

- Sharma, V. S., Dogra, M., & Suri, N. (2009). Cooling techniques for improved productivity in turning. *International Journal of Machine Tools and Manufacture*, 49(6), 435-453.
- Shin, Y. C., & Dandekar, C. (2012). Mechanics and modeling of chip formation in machining of MMC *Machining of metal matrix composites* (pp. 1-49): Springer.
- Shokoohi, Y., Khosrojerdi, E., & Shiadhi, B. R. (2015). Machining and ecological effects of a new developed cutting fluid in combination with different cooling techniques on turning operation. *Journal of Cleaner Production*, 94, 330-339.
- Sidik, N. A. C., Samion, S., Ghaderian, J., & Yazid, M. N. A. W. M. (2017). Recent progress on the application of nanofluids in minimum quantity lubrication machining: A review. *International Journal of Heat and Mass Transfer*, 108, 79-89.
- Singh, R., & Bajpai, V. (2013). Coolant and Lubrication in Machining. *Handbook of Manufacturing Engineering and Technology*, 1-34.
- Singh, T., Singh, P., Dureja, J., Dogra, M., Singh, H., & Bhatti, M. S. (2016). A review of near dry machining/minimum quantity lubrication machining of difficult to machine alloys. *International Journal of Machining and Machinability of Materials*, 18(3), 213-251.
- Sokolowski, J. H., Djurdjevic, M. B., Kierkus, C. A., & Northwood, D. O. (2001). Improvement of 319 aluminum alloy casting durability by high temperature solution treatment. *Journal of Materials Processing Technology*, 109(1-2), 174-180.
- Srikant, R., & Ramana, V. (2015). Performance evaluation of vegetable emulsifier based green cutting fluid in turning of American Iron and Steel Institute (AISI) 1040 steel—an initiative towards sustainable manufacturing. *Journal of Cleaner Production*, 108, 104-109.
- Stachurski, W., Sawicki, J., Wójcik, R., & Nadolny, K. (2018). Influence of application of hybrid MQL-CCA method of applying coolant during hob cutter sharpening on cutting blade surface condition. *Journal of Cleaner Production*, 171, 892-910.
- Stephenson, D. A., & Agapiou, J. S. (2016). *Metal cutting theory and practice*: CRC press.
- Sun, J., Wong, Y., Rahman, M., Wang, Z., Neo, K., Tan, C., & Onozuka, H. (2006). Effects of coolant supply methods and cutting conditions on tool life in end milling titanium alloy. *Machining Science and Technology*, 10(3), 355-370.

- Tash, M., Samuel, F., Mucciardi, F., & Doty, H. (2007). Effect of metallurgical parameters on the hardness and microstructural characterization of as-cast and heat-treated 356 and 319 aluminum alloys. *Materials Science and Engineering: A*, 443(1-2), 185-201.
- Thakur, A., & Gangopadhyay, S. (2016). Dry machining of nickel-based super alloy as a sustainable alternative using TiN/TiAlN coated tool. *Journal of Cleaner Production*, 129, 256-268.
- Tosun, N., & Huseyinoglu, M. (2010). Effect of MQL on surface roughness in milling of AA7075-T6. *Materials and Manufacturing Processes*, 25(8), 793-798.
- Uehara, K., Takeshita, H., & Kotaka, H. (2002). Hydrogen gas generation in the wet cutting of aluminum and its alloys. *Journal of Materials Processing Technology*, 127(2), 174-177.
- Varadarajan, A., Philip, P., & Ramamoorthy, B. (2002). Investigations on hard turning with minimal cutting fluid application (HTMF) and its comparison with dry and wet turning. *International Journal of Machine Tools and Manufacture*, 42(2), 193-200.
- Vilarinho, C., Davim, J., Soares, D., Castro, F., & Barbosa, J. (2005). Influence of the chemical composition on the machinability of brasses. *Journal of Materials Processing Technology*, 170(1-2), 441-447.
- Wagner, V., Baili, M., & Dessein, G. (2015). The relationship between the cutting speed, tool wear, and chip formation during Ti-5553 dry cutting. *The International Journal of Advanced Manufacturing Technology*, 76(5-8), 893-912.
- Whitcomb, P. J., & Anderson, M. J. (2004). *RSM simplified: optimizing processes using response surface methods for design of experiments*: CRC press.
- Wu, C.-H., & Chien, C.-H. (2007). Influence of lubrication type and process conditions on milling performance. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 221(5), 835-843.
- Xavior, M. A., & Adithan, M. (2009). Determining the influence of cutting fluids on tool wear and surface roughness during turning of AISI 304 austenitic stainless steel. *Journal of Materials Processing Technology*, 209(2), 900-909.
- Yan, S., Zhu, D., Zhuang, K., Zhang, X., & Ding, H. (2014). Modeling and analysis of coated tool temperature variation in dry milling of Inconel 718 turbine blade considering flank wear effect. *Journal of Materials Processing Technology*, 214(12), 2985-3001.

- Yang, W. p., & Tarng, Y. (1998). Design optimization of cutting parameters for turning operations based on the Taguchi method. *Journal of Materials Processing Technology*, 84(1-3), 122-129.
- Yildiz, A. R. (2013). Hybrid Taguchi-differential evolution algorithm for optimization of multi-pass turning operations. *Applied Soft Computing*, 13(3), 1433-1439.
- Yingfei, G., de Escalona, P. M., & Galloway, A. (2017). Influence of cutting parameters and tool wear on the surface integrity of cobalt-based stellite 6 alloy when machined under a dry cutting environment. *Journal of Materials Engineering and Performance*, 26(1), 312-326.
- Zhang, S., Li, J., & Wang, Y. (2012). Tool life and cutting forces in end milling Inconel 718 under dry and minimum quantity cooling lubrication cutting conditions. *Journal of Cleaner Production*, 32, 81-87.
- Zhao, G., Huang, C., He, N., Liu, H., & Zou, B. (2017). Fabrication and cutting performance of reactively hot-pressed TiB₂-TiC-SiC ternary cutting tool in hard turning of AISI H13 steel. *The International Journal of Advanced Manufacturing Technology*, 91(1-4), 943-954.